



DEPARTMENT OF NATURAL RESOURCES

www.dnr.state.mo.us

June 29, 2004

Mr. Michael J. Szafranski
Environmental Control Engineer, Technical Services
Ford Motors Company
Worldwide Environmental Support
Environmental Quality Office
Parklane Towers East, Suite 1400
One Parklane Boulevard
Dearborn, MI 48126

APPROVAL LETTER

2004-01

Dear Mr. Szafranski:

This letter is to inform you of the approval of the Vapor Recovery system, which your company has submitted to the Missouri Department of Natural Resources' Air Pollution Control Program (APCP) for MOPETP testing and approval. MOPETP testing was performed at the Ford Motors Assembly Plant located at 6250 Lindbergh in Hazelwood, Missouri.

The purpose of the MOPETP testing was to determine the performance efficiency of the vapor recovery control system to be utilized to control emissions of the initial fueling operations at the Ford St. Louis Assembly Plant in Hazelwood. The Ford St. Louis Assembly Plant has a different configuration than a normal gasoline dispensing facility (GDF) and is considered a Novel facility. This Novel facility status allows the APCP to approve systems and components designed by the Novel facility that have not been California Air Resources Board (CARB) approved. This status provides the automotive assembly plants with the flexibility to design their own vapor recovery systems utilizing a much broader scope of systems and components. However, the MOPETP approval is limited to the system as tested at the specific facility.

The Ford Hazelwood plant uses the on-board refueling vapor recovery (ORVR) system the vehicle is equipped with to reduce initial vehicle fueling emissions to less than 95%, as required by 10 CSR 10-5.220, (8). A Synchrotek nozzle is used for routine initial vehicle fueling to allow for fueling rates greater than 10 gallons per minute (gpm). This nozzle utilizes a purge puff to reduce spillage and spitback at fueling rates of 16 to 17 gpm, which is a rate significantly higher

Integrity and excellence in all we do

than the fueling flow rate at a normal GDF. Gasoline for the fueling was provided at the facility by one 30,000-gallon underground storage tank (UST) that in the final configuration, had one Husky pressure/vacuum (PV) valve for controlling emissions from the UST. Because the facility utilizes the ORVR systems on the vehicles for control of emissions, there is no vapor return lines from the assembly line fueling area to the UST. As a result, there are also no idle nozzle fugitive emissions generated from changes in pressure within the UST. See Table 1 for a list of all equipment tested at the site including its corresponding model number. See Table 2 for a list of tests and the corresponding dates the tests were performed.

Table 1 - Initial Fueling System (ORVR System and Components)

Component	Model	Number Tested
PV Valve	Husky Model 4885	1
Synchrotech Nozzle/Hose System	Synchrotech Model 014A044	2
Backup Nozzle	OPW 11VAI 27 sn 955561	1
Executive Fill	OPW 11VF 47 sn 999550	1
Ford Dual Canister ORVR System for MY 2003 Vehicles Fuel Tank Fuel Lines Filler Pipe Lower Fill Hose Small ORVR Canister Bleed ORVR Canister	3L24-9K007 3L24-2S284 3L24-9034 1L24-9047 F65X-9D653 4S4U-9G723	3 Uncontrolled 6 Controlled
Ford Single Canister ORVR System for MY 2004 Vehicles Fuel Tank Fuel Lines Filler Pipe Lower Fill Hose Torpedo ORVR Canister	3L24-9K007 3L24-2S284 3L24-9034 1L24-9047 4L2U-9D653	3 Controlled

Table 2 - Tests Conducted and Dates Performed

Test	Date
Durability (Continuous Monitoring)	Full collection from August 2, 2002 through December 7, 2003 Used for determination of breathing losses – October 26 through November 27, 2002
Bench Testing (Modified MO/TP-201.2B)	July 11, 2002 August 2, 2002 September 21, 2002 December 7, 2002 January 17, 2003
Static Pressure (Leak Decay) Testing (Modified MO/TP-201.3B)	July 12, 2002 September 21, 2002 December 7, 2002
Stage I Efficiency Test (MO/TP-06)	July 27, 2002
Stage II Efficiency Test (Modified MO/TP-07)	March 29, 2003
Spillage and Pseudo-Spillage (MO/TP-07C)	July 26, 2002

Vehicle Matrix

The Ford St. Louis Assembly plant produces a limited number of different vehicle models at their facility. These vehicle models all have the same fuel tank, fill port, and ORVR canister parts and configurations for the 2003 model year (MY) vehicles. For 2004 MY vehicles and newer, these vehicles still have the same fuel tank and fill port configuration, but have a different ORVR canister configuration. Because of this, a statistical number of each MY configuration, rather than MO/TP-07A, was used to create the vehicle matrix. This matrix is presented in Table 3.

Table 3 - Vehicle Matrix for Ford Motor Company

Test Type	Tank (Model Number/Style)	ORVR Canister	Fuel Temperature Degree F	Fueling Rate, gpm	Purge Pressure psi
Uncontrolled	3L24-9K007 3L24-2S284 3L24-9034 1L24-9047	MY 2003 Dual (Small F65X-9D653 Bleed 4S4U-9G723)	72	8	~45/~35
Controlled	3L24-9K007 3L24-2S284 3L24-9034 1L24-9047	MY 2003 Dual (Small F65X-9D653 Bleed 4S4U-9G723)	45	16 – 17	~35/~20
Controlled	3L24-9K007 3L24-2S284 3L24-9034 1L24-9047	MY 2004 Single (Torpedo 4L2U-9D653)	45	16 - 17	~35/~20

Bench Testing: MO/TP-201.2B

The MOPETP requires bench testing of nozzles, PV valves, and drain valves for transition flow and leak rates at two inches of water column ("WC) or 0.75 of the nominal cracking pressure of the PV valve. These tests are required in order to provide data to be used in evaluating the pressure related fugitive emissions of the full system and to document system performance before and after the 180-day durability test.

Bench testing was performed at the beginning and end of the 180-day durability test. Since the system tested did not have vapor connection to the storage tanks, there was no pressure on the nozzle valves to cause backpressure or leakage; thus, bench testing was required only for the PV valves on the UST.

PV Valves – Transition Flow, Leak and Cracking

Initially, Ford had a PV valve configuration on their 30,000 gallon UST that consisted of two vents with two OPW PV valves. The OPW PV valves were bench tested on July 11, 2002, and passed the test criteria. However, Ford elected to replace the OPW PV valves with Husky Model 4885 PV valves, because the higher flow rate of the OPW valves was causing higher emissions over periods of non-production than the Husky valves had been shown to allow during a MOPETP at another automobile plant. This replacement was performed on August 2, 2002.

Three Husky valves were bench tested on August 2, 2002. All three passed the testing criteria, but one valve was very close to the criteria and was saved as a spare. The other two were installed on the North and South vent pipes.

The two Husky valves were tested on September 21, 2002, with the assumption this would be the end of the durability testing. Both valves passed the bench test, but the breathing losses were still too high over the weekend using the two vent and two PV valve system. Ford then decided to cap one of the vents and to collect another month of continuous monitoring data. The north vent was capped on October 25, 2002.

The south vent PV valve was set to be bench tested on December 7, 2002, after the end of the official 33 days of monitoring. However, the valve had been put back on with excessive force and had fused to the vent pipe and was damaged when removed. The spare valve was then installed temporarily until two new valves could be tested.

Two valves were tested on January 17, 2003. One valve failed the vacuum criteria and was returned to Husky and the other passed all criteria and was placed on the south vent. The data from the south vent PV valve from August 2, and September 21, 2003, along with the UL data for high flows provided by Husky, were used for determining the breathing losses of this emission point.

Durability Test

The durability test usually lasts for 180 days in order to evaluate the durability of components used in the system for ability to withstand the variations in weather and use at a normal fueling station. Since the fueling at the assembly plant is all indoors in a controlled environment and since the system is approved only for the particular facility where it is tested, the durability testing was limited to a representative period of 33 days to provide continuous temperature and pressure monitoring for evaluation of pressure induced emissions from the UST.

The PV valve used on the UST was an approved Husky 4885. The Husky 4885 had been tested for the full 180-days during its MOPETP test in 1997 and shown to pass the MOPETP criteria after being used for over nine months (270 days) at another automobile plant.

Continuous Temperature and Pressure Testing (MO/TP-02)

Continuous temperature and pressure data was collected from July 11, through December 7, 2002 (150 days through summer, fall and winter conditions). The equipment was installed and calibrated on July 11, 2002. The temperature sensors were replaced on July 30, 2002, since they had fallen into the tank. All sensors were recalibrated on August 2, September 21, and December 7, 2002. The UST pressure patterns for the plant were similar to other auto assembly plants with USTs with high vacuums during operations and positive pressures at the cracking pressures of the PV valves during off times (mainly weekends and holidays). The relationship of UST pressure to atmospheric pressure indicated the system was probably tight (see next paragraph).

Leak Decay Tests

Leak decay tests were performed before the start of the continuous monitoring on July 11, 2002, September 21, 2002, and after the end of the continuous monitoring on December 7, 2002. All leak decay tests that were performed were passed. However, it is problematic to perform the standard leak decay test for automobile plants. This is due to the necessity of conducting the test during periods of no fueling (production down). It is during these production down times that the pressure normally rises in the storage tank due to the vapors in the ullage of the tank reaching equilibrium with the air that was ingested during the fueling periods, causing pressure growth. Close attention was paid to the rate of pressure increase both before and after the actual test to determine if the tank system had passed the test. Diurnal temperatures, which will also cause a vapor growth in the tank system, were also considered. Vapor growth from diurnal temperature changes and from the tank trying to reach natural equilibrium can often mask a leaking tank. Due to these issues, continuous monitoring data was more heavily relied on to determine tank tightness.

Stage I Efficiency Test: MO/TP-06

The Stage I Efficiency Test (MO/TP-06) was performed on July 27, 2002. The fuel delivery was made on a Saturday for the test in order to evaluate the maximum emission factor. Fuel deliveries are normally made during operations when the tank pressure is negative. At the start of the test, the PV valves were “chattering” with pressures between 3.1 and 3.2 ”WC. When the vapor adaptor was hooked up, the pressure went to zero. While the system being open to the

atmosphere during hook up is less of a problem during normal fuel deliveries, the procedure should be modified to reduce the time the system is open or eliminate the time by using popped connections. The procedure resulted in emissions since the tank was under pressure. The maximum pressures during the delivery were between 3.1 and 3.2 "WC, however, the calculations showed a volumetric efficiency of 98.1%.

The evaluation from the continuous monitoring data over the official 33-day period showed an extremely low emission factor near 100% efficiency. No bad fuel drops were recorded during this period, however, there was at least one recorded during the full time of continuous monitoring data collection.

Vehicle Fueling Tests Using Modified MO/TP-07 for ORVR Tanks and Assembly Plant

Vehicle fueling emissions testing is performed to determine the emissions during the actual dispensing of the gasoline. The test is designed to determine emissions from all of the emission points during the vehicle fueling. One major point of emissions is the nozzle/fillport interface. These emissions are determined by using a sleeve around the nozzle interface to collect emissions escaping from this area. For the ORVR canisters installed in the Ford vehicles, the vent from the ORVR canister is routed to the area of nozzle fillport allowing both sources of emissions to be measured with the same sleeve. Since there is no return of the vapors to the storage tanks and no vapor processor used at the plant since the manufacture of ORVR vehicles, the most obvious point of emissions is the nozzle/fillport interface. The Hasstech processor that had been used as the main vapor recovery control prior to the production of all ORVR vehicles at the plant had been turned off and disconnected with approval from the department. Processors such as the Hasstech do not operate efficiently with the ORVR vehicles and each often reduces the effectiveness of the other. When only ORVR vehicles are produced, the on-board canisters provide a better vapor control without involving vapor pumps, vapor processors or assist gas.

Vehicle fueling tests were performed on March 29, 2003, at the St. Louis Assembly Plant. All tests were performed during non-production times since there appeared to be no advantage to testing during operations. In addition, the automated nozzles would have made testing during operations more difficult. The Ford Motor Company St. Louis Assembly Plant produces several models but all with the same fuel tank, fill port, and ORVR canister configuration for a given model year. For the 2003 MY, which was in production at the time of testing, a dual canister system was employed while for the 2004 MY, which began production in 2003, and later model years, a single canister system was to be employed. Both types of canisters were tested. The 2003 MY vehicles were tested as fully produced vehicles, while the 2004 MY vehicles were tested as mockups.

The ORVR system and the chilling of the gasoline before fueling were the vapor recovery controls used at the plant to reduce emissions during vehicle fueling. A purge puff on the Synchrotek nozzle provides a control for reducing the spillage and pseudo-spillage during and after fueling. In order to evaluate the uncontrolled emissions without the temperature and ORVR control, three mockup tanks using the 2003 MY canister and tank set up were performed with

unchilled gasoline (72 °F). The tests were performed on mockups so that the canisters could be weighed to determine the total vapors produced during fueling. The fueling rate was reduced to 8 gpm to avoid spitback when fueling with the higher temperature gasoline.

The controlled tests of the 2003 MY systems were performed with actual assembly line vehicles during non-production time since the ORVR canisters did not need to be weighed. Eleven vehicles were tested and five were used for the evaluation. Six of the tests failed to meet criteria because the emissions around the sleeve were beyond the allowable limit of 2,100 ppm as measured with a Flame Ionization Detector.

There were two differences between the test conditions and pretest conditions during which there was no problem with the excess emissions around the sleeve. First, before the start of testing on March 29, 2003, it was determined that while the Hasstech processor had been turned off and disconnected in preparation for the test, the vapor line directly from the Synchrotek nozzle had been left open to the atmosphere. As a result, this allowed an open path for emissions. This valve was shut before the start of testing on March 29, 2003.

The first vehicles tested exhibited significant emissions around the sleeve and were invalidated. Modifications were made to the sleeve and flow rate for monitoring the emissions, but the excess emissions were still too high. In addition to the closing of the vapor line to eliminate the vapor emissions path, it was determined during the initial testing that the pressure in the system controlling the purge puffs for the Synchrotek nozzle were higher than during actual operations. When the pressure was adjusted to a steady state value of about 35 pounds per square inch (psi) with the pressure during purge of about 20 psi, then the emissions around the sleeve were reduced and then resulted in valid data.

The controlled tests of the 2004 MY systems with a single ORVR canister were performed on mockup tanks since there were no production vehicles. These tests were performed after the problem with the purge puff pressures was discovered and corrected. All three tests were used in evaluation of the emissions. The results from the three tests were consistent. The results of the tests are presented in Table 4.

Table 4 - MOPETP Vehicle Fueling Test Results

Run ID	Date	Dispensing Volume gal	Dispensing Rate gpm	and ORVR System Emission Factor lb/1,000 gal	Cannister Capture Factor lb/1,000 gal	Initial Fueling Emission Factor lb/1,000 gal	Control Efficiency (%)
Uncontrolled Emission Mock-Ups							
U1	3/29/2003	13.1	8	Test Failed due to automatic shutoff related to fuel temperature			
U2	3/29/2003	15.0	8	0.1702	13.59517	13.7653	
U3	3/29/2003	15.0	8	0.2228	12.99258	13.2154	
Average				0.1965	13.2939	13.4904	
2003 MY Assembly Line Vehicles							
V1 *	3/29/2003	15.0	16	Test Failed			
V2 *	3/29/2003	15.0	16	Test Failed			
V3 *	3/29/2003	15.0	16	Test Failed			
V4 *	3/29/2003	15.0	16	Test Failed			
V5	3/29/2003	15.0	16	0.0218			99.84%
V6 *	3/29/2003	15.0	16	Test Failed			
V7 *	3/29/2003	15.0	16	Test Failed			
V8	3/29/2003	15.0	16	0.0210			99.84%
V9	3/29/2003	15.0	16	0.0117			99.91%
V10 **	3/29/2003	15.0	16	0.0043			99.97%
V11 **	3/29/2003	15.0	16	0.0003			99.99%
Average				0.0118			99.91%
2004 MY Mock-Ups							
S1	3/29/2003	15.0	16	0.0036			
S2	3/29/2003	15.0	16	0.0031			
S3 **	3/29/2003	15.0	16	0.0033			
Average				0.0033			99.98%

* - Tests failed due to excess emissions around sleeve. Adjustments to the sleeve, sleeve flow & purge pressure were made.

** - Tests stopped before full 4 minutes after fill so not all emissions due to gas cap not being installed are counted.

Note that the additional emissions related to installation of the gas cap after four minutes rather than immediately after fueling are approximately 0.01 lb/1000 gallons for the dual canister. If the last two controlled tests had left the sleeve on for the full four minutes after fueling, the final average emissions would have been 0.0158 lbs/1000 gallons, resulting in a final efficiency of 99.88% rather than 99.91%. For the single canister, the additional emissions appear to have been reduced to 0.001 lb/1000 gallons making the average virtually unchanged.

Spillage and Pseudo-spillage Testing (MO/TP-07C)

Spillage and pseudo-spillage testing were conducted on July 26, 2003. Prior to the testing, a calibration on butcher paper was performed and used to determine the volumes of spills during the testing. Both of the fueling points (inboard and outboard) were tested. There was acceptable consistency among the 9 data points collected for each fueling point. The values determined for spillage and pseudo-spillage together (0.063 lbs emission/1000 gallons dispensed) are less than one tenth the value for spillage allowed by the MOPETP based on the value used by CARB (0.75 lbs emission/1000 gallons dispensed). The use of the purge puff on the Synchrotek nozzle greatly reduces these spillage emissions, thereby improving efficiency.

Determination of the Overall Efficiency of the System Tested

The MOPETP requires the overall efficiency of the system to be at least 95% as determined from the ratio of the total emission factor determined at the site divided by the total for an equivalent uncontrolled facility. The value for the uncontrolled facility is determined using the same fuel vapor pressure (RVP) and temperature conditions (environmental not chilled gas) as the MOPETP testing. The uncontrolled condition will also include facility specific issues for the Novel system being tested. The overall efficiency includes the contributions from losses (emissions) at:

1. The vent pipes and tanker truck connection during bulk fuel delivery (**Loading**) as determined by using the PV valve bench test data (MO/TP-02).
2. The continuous temperature and pressure monitoring data for the 33 days (MO/TP-01).
3. The losses at the nozzle/vehicle fillport during vehicle fueling (**Vehicle Fueling**) as determined by using the modified MO/TP-07 as described in the work plans.
4. Losses due to spillage and pseudo-spillage (**Spillage/Pseudo-spillage**) as determined by MO/TP-07C.
5. Pressure related fugitive losses determined from the bench test leak rates (MO/TP-02).
6. The continuous tank pressure data (MO/TP-01)(**Breathing**).

The MOPETP allows for the use of uncontrolled emission factors determined during the testing, or for the use of documented or calculated values determined under similar conditions (RVP, temperature, etc.) to those of the controlled tests.

Loading. For the Stage I test, an RVP of 11.3 psi was used as an average of the RVP of the gasoline used during the 180 day period and average temperatures during the period were also used in the AP-42 equations. Table 4 provides the appropriate uncontrolled values as well as the values obtained during the GM MOPETP testing. The values for the uncontrolled emissions during a bulk fuel delivery for comparison with the Stage I emissions from MO/TP-201.1 were determined using an equation obtained from AP-42 (U.S.EPA, 1995). The nominal molecular weight used is 66 lbs/lb-mole taken from AP-42 for RVP of 11 psi. A table of saturation factors as well as average temperatures for various regions of the country at various times are provided in AP-42 (see final report for equations).

Spillage/Pseudospillage. The total value for uncontrolled spillage and pseudospillage used by CARB is 0.75 lbs vapors emitted/1000 gallons dispensed. This value has been used for the uncontrolled value in Table 5. The controlled value is 0.063 lbs vapors emitted/1000 gallons dispensed as determined by the testing at the facility.

Breathing. Uncontrolled breathing losses were calculated using modified AP-42 calculations to account for the impact of the vapor growth related to the ingestion of air during production in addition to the normal diurnal pressure variation.

An RVP of 10.5 psi determined at the mid-point of the official monitoring period was used in the calculations along with the average tank pressures and temperatures determined during the period. The controlled value was determined from the bench testing data on the PV valve providing the leak rate at various pressures and the continuous temperature and pressure monitoring providing a distribution of a number of minutes that the tank spent in various pressure ranges.

The final controlled emission factor was 0.27 lbs. vapor emitted/1000 gallons dispensed. This value would have been higher without the capping of the north vent. Even with this action, the efficiency of the reduction of the breathing losses was only 87.2% due to the long periods near the cracking pressure during non-production times.

Table 5 - Summary of emission factors and efficiency determinations.

Source	Emission Factors in lbs Vapors Emitted/1000 Gallons of Fuel Dispensed		Efficiency Relative to Uncontrolled System
	Uncontrolled System	2003 MY Configuration	2003 MY Configuration
Loading	13.53	0.000	100.00%
Vehicle Fueling	13.49	0.012	99.91%
Spillage/Pseudo-Spillage	0.75	0.063	91.60%
Breathing (Pressure Related Fugitives)	2.09	0.267	87.22%
TOTAL	29.87	0.342	98.85%

Note: The uncontrolled breathing losses would be approximately double, as would the controlled breathing losses if the north vent had not been capped.

The 2004 MY canister reduced the vehicle fueling emission factor to 0.003 lbs/1000 gallons resulting in a vehicle fueling efficiency of 99.98% and overall efficiency of **98.88%**.

Table 6 provides the emissions reductions in tons/year for the controlled initial vehicle fueling vapor recovery system at the Ford Motor Company, St. Louis Assembly Plant. ***Over 44 tons of Hydrocarbon emissions per year are saved by having controls on the system. An additional reduction of approximately 2.7 tons per year was made by capping the north vent.*** The annual volume of 3 million gallons per year of gasoline dispensed is based on twelve times the monthly value determined during the testing period.

Table 6 - Emissions Summary at Source

Source	Emission Rates in tons/year (using the total of 3,000,000 gallons/yr delivered and dispensed)		Reduction of Emissions in tons/year
	Uncontrolled System	2003 MY Configuration	2003 MY Configuration
Loading	20.3	0.0	20.3
Vehicle Fueling	20.2	0.0	20.2
Spillage/Pseudo-Spillage	1.1	0.1	1.0
Breathing (Pressure Related Fugitives) – One vent & PV Valve	3.1	0.4	2.7
TOTAL	44.7	0.5	44.2

Results of Testing and Conditions for Approval

The vapor recovery system tested at the Ford Motor Company, St. Louis Assembly Plant in Hazelwood, Missouri passed the overall efficiency at **98.85%** using the 2003 MY configuration and **98.88%** using the 2004 MY configuration. The OPW backup nozzle was not tested because it is used to fuel less than 15,000 gallons annually.

By this letter the APCP has hereby approved this vapor recovery system as tested (see Table 1 for details, model numbers and configurations) to be MOPETP approved with the restrictions, maintenance and testing requirements listed below. Since the Ford Motor Company, St. Louis Assembly Plant is a Novel facility, the approval for this system is unique and specifically for the components (including nozzles and vehicle tank and canister specifications) as set up at this facility. If any of these components change, notification to the department will be required and the changes may be approved with engineering evaluation or further testing as determined by a Technical Review Committee (TRC) Meeting. The extent of testing will depend on the extent and impact of the changes.

Conditions, Restrictions, Maintenance and Testing Requirements:

1. PV valve should be tested and/or replaced with bench tested valves annually.
2. There will be only one vent pipe active on the UST. If there are any changes to this configuration, the department must be notified.
3. Leak Decay testing as required by the Operation Permit (every five years). Testing must be performed in a way that the natural pressure growth of the system on weekends is taken into account in the test evaluation, since the growth may mask a leak greater than that allowed. Due to the PV valves being the only source of leaks, replacing them as discussed in item one should be sufficient to maintain a leak tight system between permit renewals.
4. The valves from the vapor recovery lines on the Synchrotek nozzles that led to the Hasstech incinerator, will be tagged and continue to remain closed (they may be completely removed and sealed) and locked during operation of the initial fuel dispensing system to avoid emissions through this path.
5. If the back up nozzle (OPW) is used to dispense more than 15,000 gallons/year, the department must be notified. The nozzle can be used for short, emergency periods with no notification since the use of the nozzle under these conditions should incur minimal impact to the emissions.
6. The executive filling system is connected to the same UST as the initial fueling operation. The nozzle used for the executive fill is a standard nozzle. The only vapor recovery control is the restriction of fueling only ORVR vehicles at this filling area.

7. The pressure setting of the pressure valve related to the purge puff on the Synchrotek nozzle is a significant part of the controlled system. The purge puff reduces the spillage and pseudospillage significantly. However, if the pressure is too high, the emissions at the nozzle fillport can be excessive. All interested parties agreed that the static line pressure setting will be less than or equal to 40 psi and the puff pressure will be between 10 and 24 psi during the operation of the initial fuel system.
8. The gauge for purge puff monitoring pressure must be operational, clearly marked and of sufficient size to be read by an inspector from the floor near the nozzle.
9. If the nozzle or other components are changed (with others not identical), including the ORVR and vehicle fill port system, notification must be made to the department and additional testing may be required as determined by a TRC meeting.
10. The fuel at the vehicle fueling on the assembly line must be chilled to 50° F or below since this is one of the controls under which successful testing was performed.
11. Vehicle fueling rates should not exceed 17 gpm, the maximum flow rate tested.
12. Make modification to the fuel drop procedures normally used to eliminate or significantly reduce the emissions from the vapor adaptor. This should include, but not necessarily be limited to, the installation of a poppeted vapor adaptor. See Stage I Efficiency Test MO/TP – 06.

We thank you for your cooperation in this matter. If you have any questions concerning this approval, please contact Bud Pratt at the APCP, P.O. Box 176, Jefferson City, MO 65102-0176, or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Original Signed by Leanne Tippet Mosby

Leanne Tippet Mosby
Director

LTM:bpt